

File browsing using Bluetooth[®] wireless technology

User manual for Resco Explorer 2008 v4.00

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1 Bluetooth file transfer

1.1 What does it mean?

Using *Bluetooth* file transfer you can connect to another device and access its files as if they were on the local card.

Example:

Say you have a Treo and your friend a Nokia device. Explorer 2008 lets you connect to the Nokia phone and it will show all phone drives as local cards. You will be able to manage the files on the phone: Download, upload, delete and create files, play phone mp3's or preview its images etc. – all of that using familiar Explorer interface.

In order to use this technology, both devices must be equipped with needed software. Here is a brief preview of various alternatives you can use. We suppose that you have a Palm OS device (client) with Explorer 2008 and try to access another device (server).

Target device (server)	Remark
Palm OS	Needs either Resco <i>Blue FTP</i> ¹ or Softick Blue Files server
Pocket PC	Mostly impossible: PPC devices generally use Microsoft <i>Bluetooth</i> drivers that do not allow file browsing. Exceptions are rare models using so-called Widcomm ² BT stack ³ (HP IPAQ).
Symbian/Nokia phones	If the phone supports FTP (most Nokia phones do), you don't need to do anything.
Windows PC	A PC usually comes without a <i>Bluetooth</i> adapter and most existing <i>Bluetooth</i> dongles use <i>Widcomm Bluetooth stack</i> . Hence, in the typical case you will have no problem.
Windows laptop	Laptops usually have built-in <i>Bluetooth</i> . It then depends on the drivers: Microsoft drivers are insufficient; you need <i>Widcomm Bluetooth stack</i> .
Mac OS X	v10.2 or later contains support for <i>File Transfer Profile</i>
Linux	Must have installed Bluez (<i>Bluetooth stack</i>) and OpenFTP.

The roles can be exchanged, i.e. you could access your Palm PDA from another device. In this case you need to convert your PDA to a *Bluetooth File Transfer Server*. One way is to install and run Resco *Blue FTP* server included in the Explorer 2008 zip installer.

¹ Part of the Explorer 2008 installation

² Also called Broadcom

³ For advanced users: PocketPC magazine contains tutorials for Widcomm stack installation for several PPC devices. (See references)

1.2 About the Bluetooth wireless technology

About Bluetooth® Wireless Technology

Bluetooth wireless technology is the global short-range wireless standard for personal connectivity of a broad range of electronic devices. The technology is now available in its fourth version of the core specification and continues to develop, building on its inherent strengths – small-form factor radio, low power, low cost, built-in security, robustness, ease-of-use, and ad hoc networking abilities. Three new *Bluetooth* enabled products are qualified every day and 10 million *Bluetooth* units are shipping per week. The installed base of *Bluetooth* devices was over 500 million products at the end of 2005 and is projected to surpass one billion by the end of 2006, making it the only proven choice for developers, product manufacturers, and consumers worldwide.

Bluetooth version

Since the *Bluetooth* introduction (1994) the standard was several times improved. These milestones are known as *Bluetooth* versions: 1.0, 1.1, 1.2, 2.0 and 2.1. Higher version means higher speed, better security, less bugs.

Treo 650 has *Bluetooth* 1.1, while higher models may have either 1.1 or 1.2. (*Bluetooth* 1.2 was part of the Palm OS patch provided for 680, 700p, 755p, Centro.)

Palm OS PDA models have mostly even lower *Bluetooth* version. (Only the LifeDrive has *Bluetooth* 1.1.) Newest Symbian phones, for example, use *Bluetooth* 2.0.

Bluetooth services

Bluetooth communication is always client-server based, i.e. one device (client) tries to make use of the services offered by another device (server). Server offers list of services, called also *Bluetooth* profiles.

A well-known profile implemented on nearly all BT-equipped devices is OBEX data exchange (OBEX = Object Exchange). This is what you use when you beam or send a data file between various devices. OBEX allows for exchange of known data types and hides as many implementation details as possible. (Discussed later.)

The list of existing BT services contains approx. 30 profiles at present. You will find support for images, printing, contacts, but also more exotic examples such as using your PDA as a keyboard or mouse etc.

The profile required by Explorer 2008 is called **File Transfer Profile (FTP)**. It allows access to the files on another device, incl. getting folder listings, changing to different folders, copying and deleting files. Generally speaking the Explorer is able to access all devices that implement this *Bluetooth* profile. Unfortunately, getting this information may not be easy: Sometimes (case of the desktop computers) you can find it somewhere in the *Bluetooth* settings; in the remaining cases you have to search the device documentation or rely on the old good trial and error procedure.

Bluetooth security features

1. Device must be discoverable (visible to other devices). The user can use the BT preferences to set the device as non-discoverable and prevent thus any BT communication. (Strictly speaking the device will be still visible to those devices that were paired in the past.)
2. The devices must be paired, i.e. they must exchange a secret key (*Bluetooth* PIN). The owner of the device that is being accessed (server) determines the PIN code and the owner of the client device must type the PIN code in order to access the server.
3. The server can assign the client the role of a trusted device, in which case the process of pairing needs not to be repeated in the future communication.
4. Actual data communication over *Bluetooth* is usually encrypted, whereby the encryption key (link key) is generated from the exchanged PIN code. For the trusted connections the link key is stored in the device's memory, so that the process of pairing could be skipped.

1.3 Limitations of the traditional Bluetooth send

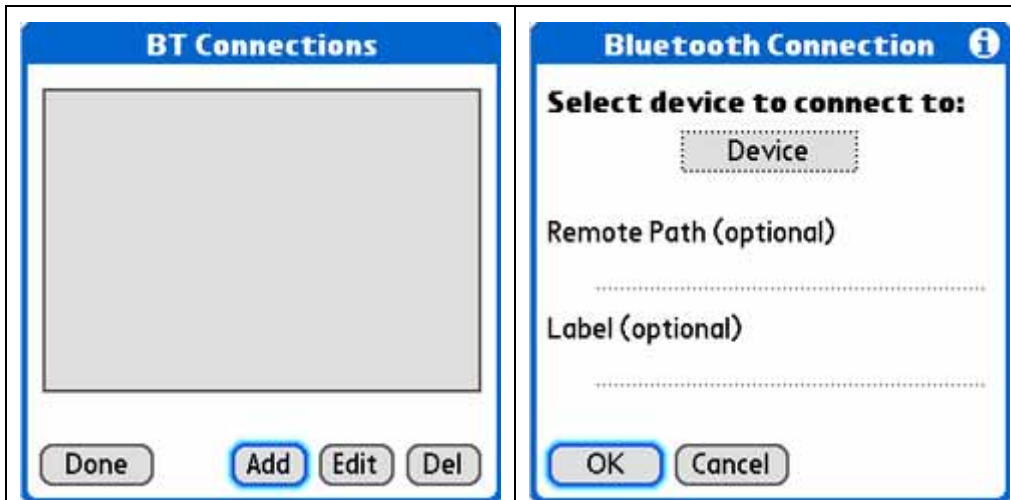
Many users are satisfied with the traditional *Bluetooth* model (called OBEX push) and do not realize its limitations:

- Palm OS can receive only files of a known type. E.g. Palm OS will accept a jpg file as the device (usually) has a viewer. Similarly a txt file will go to Memos and a prc to the launcher.
- Files that cannot be opened by any installed application (e.g. special image format) are refused.
- You cannot decide what should be done with the file, e.g. you cannot save a txt file to the card.
- There are similar limitations for other operating systems. E.g. a Windows Mobile device will store the file in the fixed location (\My Documents folder).
- This method was designed to send a single file. Although sending several files is possible, most applications will have a problem here.
- Large files are a problem, too: The file being sent is first received into the memory and only then passed to the receiving application. If you try to send a large image or an mp3, you risk a memory problem and possible crash.
- OBEX push is not suited for more general operations such as file browsing.

2 Using *Bluetooth* FTP in Explorer

2.1 *Bluetooth* connections

Defining a *Bluetooth* connection resembles the way Explorer uses the network.



- Open the *BT Connections* dialog from the main menu
- Press *Add*
- Select the device by pressing the *Device* trigger
- Optionally give some name (*Label*) to the newly defined connection
- Explorer can connect to any subfolder of the remote drive (*Remote Path*)

Next figure shows what you get. (Thanks, Tam, for the image.) The *Bluetooth* device is added as a node into the Explorer network hierarchy. You can browse the device, copy/delete the files, view image etc.

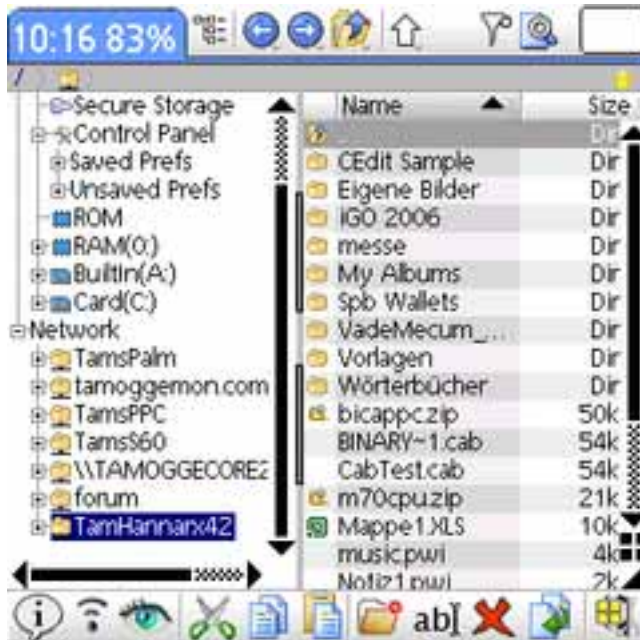
As far the functionality is concerned, there are minor limitations: You can't open zip archives or rename files. Everything else works; you can even play remote mp3 songs⁴.

If you want a comparison between BT browsing and using the network (BT connection represents one way how to attach to the local LAN network):

- *Bluetooth* connection does not require tcp connectivity; hence it can be used in more cases. (E.g. connecting to Nokia phones.)
- *Bluetooth* connection is faster as it does not have the network overhead. Our tests of the transfers between a PC and Palm OS handhelds showed the speed differences of 20-30%. This might be just the difference that enables smooth playback of the remote mp3 files.

⁴ Provided: a) Your *Bluetooth* connection is sufficiently fast. b) You use Explorer mp3 player; PocketTunes and other known players cannot do that.

- Network connection is less sensitive to errors. (E.g. tcp error recovery mechanism.) Note that the quality of the data transfer depends on the *Bluetooth* software version, e.g. Nokia phones using *Bluetooth* 2.0 provide better results.



2.2 Problems

The above procedure looks simple, but there are a number of conditions that need to be fulfilled:

- The target device must be discoverable. (Part of *Bluetooth* preferences on Palm OS.)
- The devices must be in range. Note that *Bluetooth* connection quality is sensitive to the distance between the devices. (Closer distance may bring improved quality and higher speed.)
- The target device needs to support *Bluetooth File Transfer*. (Discussed elsewhere)
- *Bluetooth* protocol is sensitive to all kinds of problems. E.g. if you type a wrong PIN code during the pairing process, you may experience troubles when repeating the procedure.
- If the devices use **different character sets**, Explorer may not recognize the local file names. (Usually you get NoSuchFile errors.) This often happens with localized Nokia phones. (On the other hand, these phones usually allow switching of the English language, which solves most of the problems.)

Disregarding these problems, *Bluetooth* connection represents an interesting possibility that can be used in situations when all other options fail.

3 Setup of the target device

An alternative source of documentation is the online help for Softick Blue Files – see the references. (Contains e.g. useful info for Mac/Linux users.)

3.1 Windows PC

As we already mentioned Windows-based devices usually belong to two major groups:

- Those using Microsoft BT drivers (*Microsoft Bluetooth stack*), or
- Those using Widcomm drivers (*Widcomm Bluetooth stack*)

The difference in the usability between these 2 cases is substantial: While Microsoft is oriented towards simple *Bluetooth* usage (OBEX push, My Documents folder etc.), Widcomm implements more capable interfaces.

In other words, if you want to use *Bluetooth* to access files on a Windows PC, you need to assure that the PC uses Widcomm drivers. This condition is usually fulfilled quite easily as a standard Windows PC has no *Bluetooth* support and most available *Bluetooth* dongles use Widcomm drivers.

How to add *Bluetooth* to your PC

If you visit your computer store, you will certainly find several possibilities. E.g. USB *Bluetooth* dongles represent an affordable option (they are really cheap) with an easy installation (usually just plug-in into an USB port).

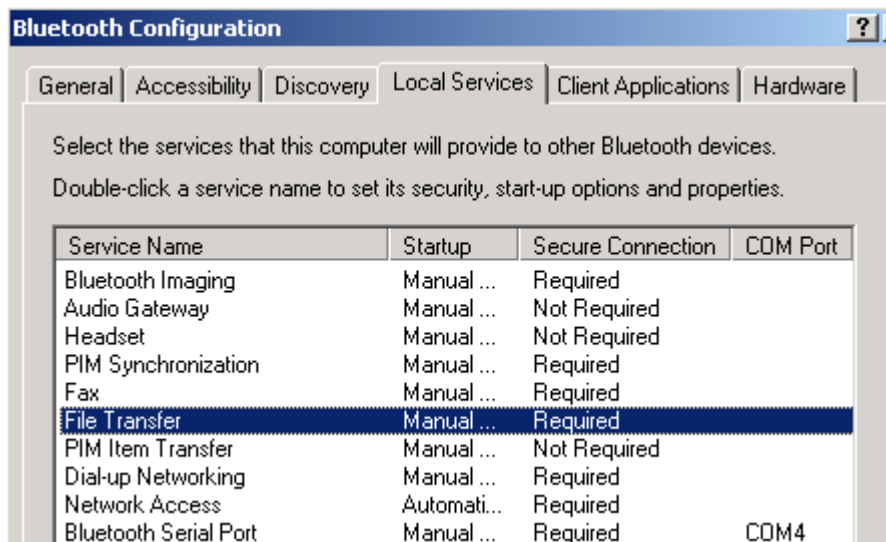
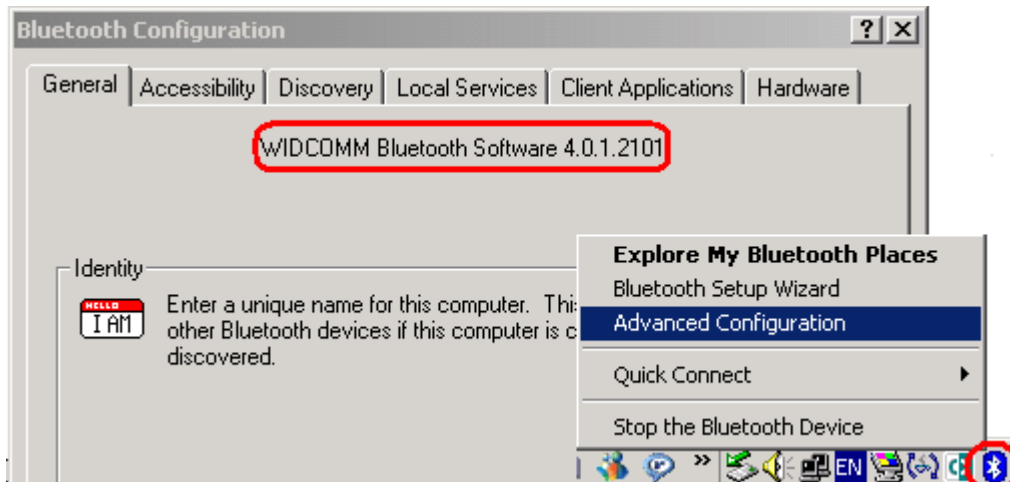
To make sure that the dongle suits your needs follow these recommendations:

- Ask the reseller if it comes with Widcomm drivers for your OS version.
- Alternatively find the dongle description on the web (look for the manufacturer web site) and check the items such as *Bluetooth* version (preferably 2.0 or higher), supported Windows version and supported *Bluetooth* profiles (look for the File Transfer Profile).

How to check if your PC supports *Bluetooth* FTP

The procedure is illustrated by the following figures:

1. Right click the *Bluetooth* icon in the system tray and open the Advanced configuration.
2. Check that the General tab indicates the presence of the Widcomm driver.
3. Check that the File Transfer local service is active.



If you find that your PC (laptop) already has Microsoft *Bluetooth* support then you need to uninstall original drivers and install the ones that come with the dongle. Although finding help on the web is not too difficult, this procedure can be recommended only for the advanced users.

3.2 Pocket PC

Most Windows Mobile devices come (not surprisingly) with the Microsoft *Bluetooth* stack preinstalled. (HP IPAQ is a notable exception.) This is a kind of a stop message for the vast majority of the WM users.

For the advanced users: The Pocket PC magazine published several articles on this topic, including step-by-step procedures how to install Widcomm drivers onto selected WM devices. (See the references.)

3.3 Another Palm OS handheld (*Resco Blue FTP*)

Palm OS itself supports only standard OBEX push, hence you need an additional software – a File Transfer server that will run on the handheld and return the information asked by the client. What might disappoint many users is that the server application will fully occupy the Palm OS PDA, i.e. the user will not be able to use it for another activity. (Note: This is a consequence of the single-task nature of the Palm OS system.)

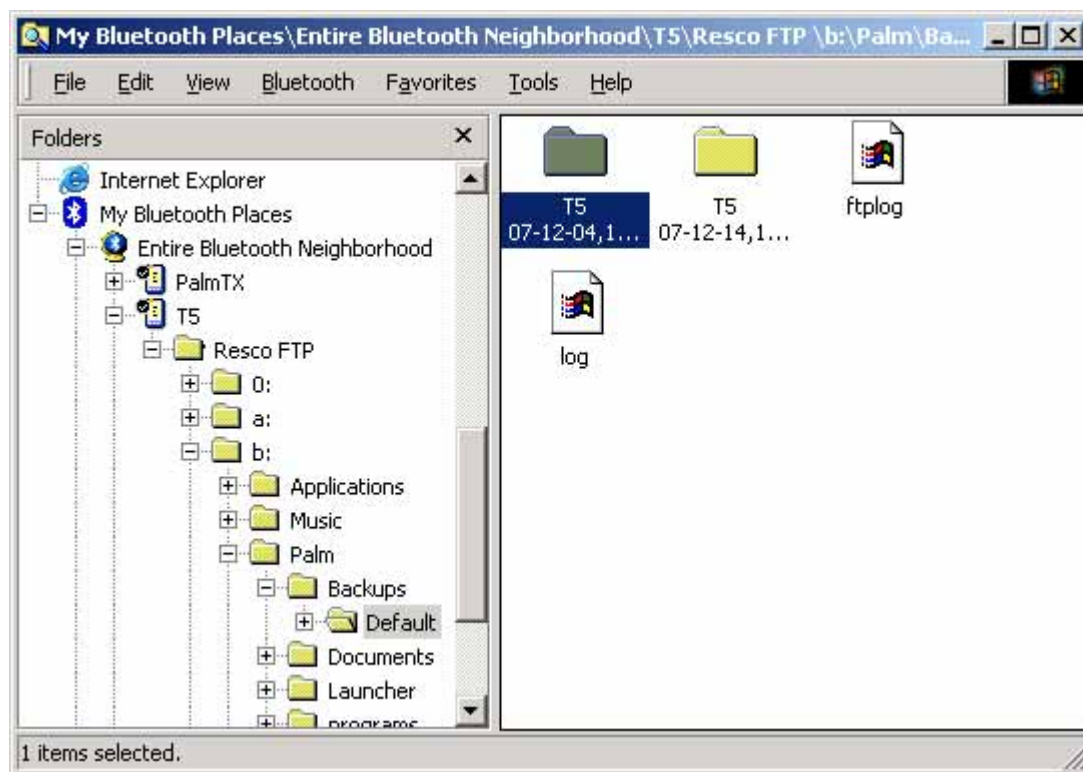
There are two *Bluetooth* FTP servers you can use:

- Softick Blue Files
- *Resco Blue FTP* delivered as part of the Resco Explorer 2008 installer.

Both applications behave similarly: After the launch they will start waiting for the client device queries, i.e. they will deliver information about the files and folders on the handheld and perform other operations requested by the client.

When the client attempts the first contact, the user having the server handheld must allow it. Since that time the client is granted a free access – unless the server owner deletes the device from the list of allowed devices. (Server application menu)

Next figure demonstrates what you gain: It shows Windows Explorer with a connection to a T5 handheld running *Resco Blue FTP* server. Note that the drive letters are the same as used by the Resco Explorer application on the handheld. (A small advantage against the Softick software.)



Usage remarks:

- To use *Blue FTP* the *Bluetooth* must be turned on (Prefs) and this device must be set as discoverable.
- **National support:** If the client/server devices use different languages, local file names may be misrecognized.
- If you use *Bluetooth* for networking or another activity, make sure that activity terminated prior to starting *Blue FTP* - or you get btLibBusy error. One way how to solve this error is to switch the *Bluetooth* first off, then on.

3.4 Symbian

Although the File Transfer Profile is supported by Symbian OS, the actual implementation depends on the device manufacturer. Most Nokia phones (at least the newer models) seem to support the FTP profile. You have to try it; there is no indication on the phone itself.

4 References

- o File and PIM transfer between Pocket PC and Palm OS devices & advanced Pocket PC Bluetooth answers and explanations; <http://www.pocketpcmag.com/blogs/index.php?blog=3&p=1065&more=1&c=1&tb=1&pb=1>
- o Pocket PC Phone Edition users: Change the Microsoft Bluetooth stack to the Widcomm one! <http://www.pocketpcmag.com/blogs/index.php?blog=3&p=1649&more=1&c=1&tb=1&pb=1>
- o Softick Blue Files documentation; http://www.softick.com/bluefiles/index.php?page=2&new_lang=en